FEB. 9-15
NATIONAL ELECTRICAL WEEK

ELECTRICITY ON THE FARM *Magazine*

• FEBRUARY, 1958

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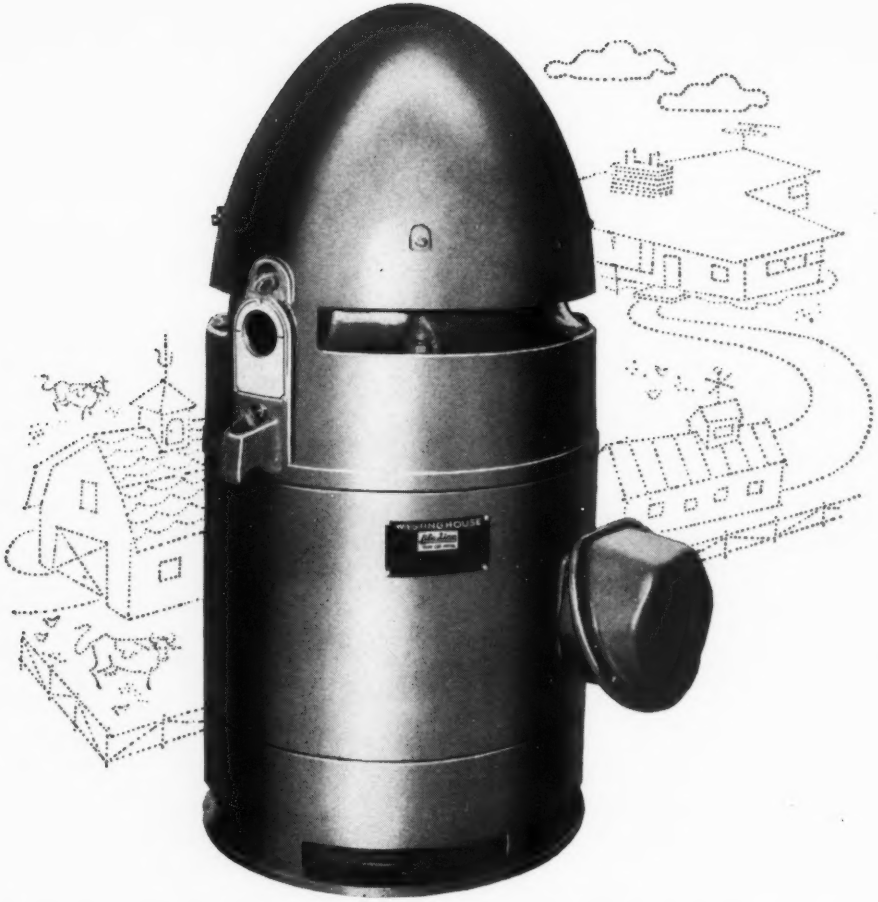
Irrigation Saved the Crop
. . . . Page 6

"We Converted for Efficiency"
. . . . Page 8

All-Electric Kitchens for '58
. . . . Page 20

MOTHER AND BROOD are warm and comfortable in spite of Old Man Winter. Heating cables in floor do the job automatically. See page 10 for details.



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YOU CAN BE SURE...IF IT'S Westinghouse

Editor's Chat

NATIONAL ELECTRICAL WEEK

During the week of February 9-15, a nationwide spotlight is focused on the many contributions and benefits that electricity and electrical equipment contribute to our way of life today. America and the electrical industry have come a long way in the 78 years since Thomas A. Edison invented the first successful light bulb and thus put electricity to a practical use.

This particular week is also a very fitting time to pay tribute to all of our electrical pioneers who have so greatly benefited mankind. We will observe the 111th anniversary of Edison's birth on February 11th. He and many others like him contributed beyond comprehension to our nation's progress and economy.

These long winter evenings might be a good time for each of us to take a look at the number of benefits electricity is providing for us and the many wonders it will perform at the click of a switch. Might also be a good time to figure out some new uses which we might make of it to our advantage.

ARE YOU IN "HOT WATER"

We don't know how that expression came into use so long ago because hot water, and plenty of it, is a fairly recent development in our civilization. In fact, water in plentiful supply under pressure and heated to the exact temperature desired did not come into general use until the automatic electric pump and water heater made this twofold blessing practical and possible for everyone who wants it.

Today power lines run to almost every home. And mass production of power and the pumps and electric water heaters to use it has brought the cost of both power and the appliances within reach of everyone. If you are in "Hot Water" because you do not have enough of it at the right place, time and temperature, join the crowd and get your quota now. It is one of the greatest blessing at the lowest price you can find on today's market.

IN AGAIN, OUT AGAIN, GONE AGAIN

Not being much of a musician nor any good at all at composing lyrics, we will let each of you compose your own verse and tune as you dish out silage and feed, clean up behind the cows and then tote the net result to the lot.

Altogether it means an awful lot of lifting and lugging in the course of a year. And a lot of it could be done by a little electric motor working for a few cents a day, and by a suitable arrangement of feed belts, gutter cleaners and a silo unloader.

If you are addicted to hard work and if you like to sing to yourself and the cows, just think up a little song about "in again, out again and gone again" and keep right on working more than you really need to. However, it is possible to turn on a radio or a phonograph for the music and turn on a switch for the silo unloader, gutter cleaner and a feed belt. It may make you feel so good you will want to join in the chorus with the thousands who already have these things. They really do the work.

Jim Ridout

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ELECTRICITY ON THE FARM *Magazine*

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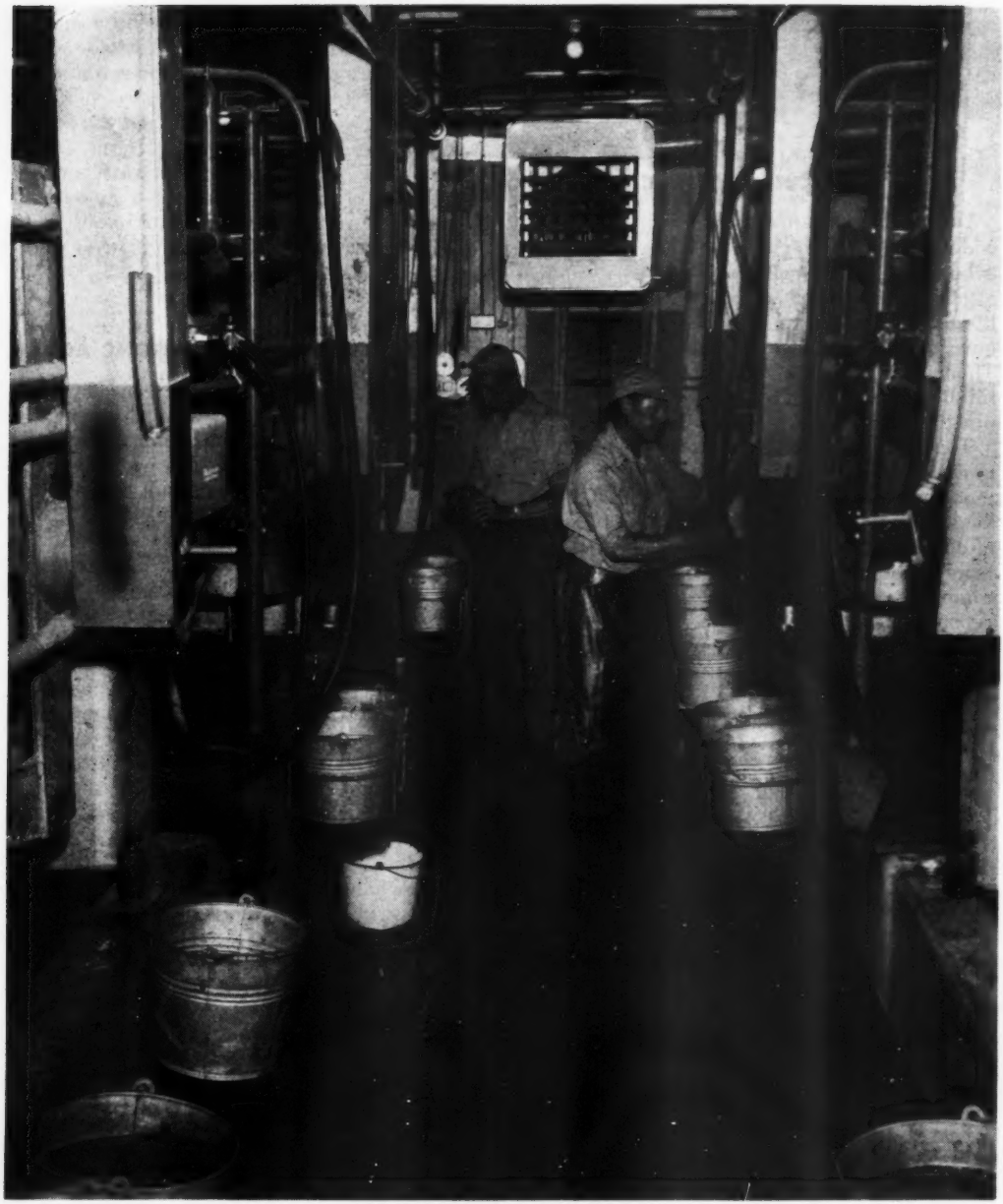


"Our watchword was STREAMLINING . . . Chore areas were fitted with all equipment and tools needed for the utmost efficiency and a minimum of effort by the workers. . . ."

This Is Mechanization...

Eliminating the pitfalls this dairy operation was facing

By W. C. GUNDERMAN

Mechanization and efficiency go hand in hand on today's modern dairy farms. This fact is, indeed, truly exemplified in the new dairy operation structure on the Lawrence Draper farm near Geneva, New York.

Milk is no longer handled manually. Pipeline equipment takes it directly from cow to bulk tank. It all adds up to better sanitation, more positive product quality control, and lower labor demands.

Expanded for Survival

Larry decided in 1955 that the 31-cow milking herd in his stall barn was too small for meeting the trend in efficient milk production. Plans were drawn up for expansion, construction was started, and in the fall of 1956 the milking herd was moved into the all new "U"-shaped, loose housing structure.

The feeding area or "Cowfeteria" for 100 cows features self-feeding of hay directly from storage mow. Automatic stock waterers provide ice-free water year-round. Across the paved area are two large silos with electric unloading equipment delivering directly into an auger bunk feeder, running the entire length of the 145-foot building. At the base of the "U" a six stall milking room with an accompanying milk processing room ties the two areas together.

Grain is fed at milking time to lure the cows to line up in an orderly fashion and enter the milking room without further inducement. The grain is metered out of a chute adjacent to each stall. A crank on each chute rations out one pound of feed for each turn. Each chute is kept filled by a chain type automatic poultry feeder delivering the concentrate from an overhead storage bin.

Cold and hot water are available at each stall with a spray nozzle and a tempering faucet that keeps the water at slightly above body temperature. This not only aids in controlling sanitation but relaxes the udder for fast and complete milking.

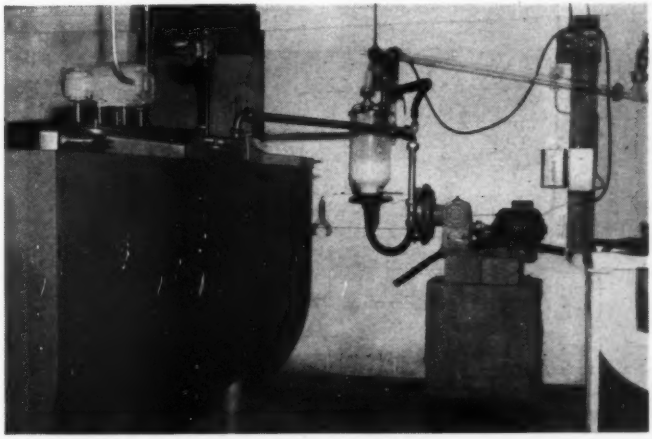
The six mechanical milker units are connected to a pyrex glass pipeline. An electronic device measures the milk and a stainless steel pump delivers it directly to a 600-gallon refrigerated bulk tank which removes the heat and maintains quality.

Savings are in Mechanization

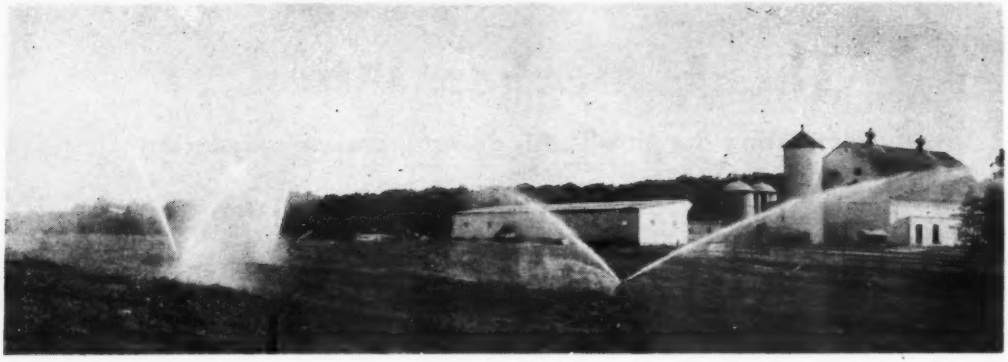
The economics of a dairy operation of this type are in the mechancial equipment that replaces manual labor. Silage, 500 tons of it, are handled entirely by mechanical means. Larry estimates that about 1000 man hours are saved annually in this one operation. The converted poultry feeder moves about 80 tons of concentrates. The pipelines carry at least 500 tons of milk annually.

The standup milking process assures the operator of less fatigue and fewer hazards to health and comfort. Surroundings and working conditions closely parallel those found in most factories and labor competition from industry becomes less of a factor. At present, herdsman Fred Lagg, with chore time assistance from one additional man, handles all of the labor.

A fine farm home graces the farmstead with many electrical appliances serving the family. A fully equipped farm service shop with electric welder, air compressor and many electric hand tools keep the Draper machinery repaired at all times. □ □



GLASS PIPELINE carries 1½ ton of milk daily from milking room at right directly into refrigerated bulk tank without manual handling or exposure to open air.



NOURISHING WATER sprinkled on the alfalfa crop produced three good cuttings in spite of the severe summer drought.

Irrigation Saved the Crop!

Sprinkler system took over when Nature fell short

By H. A. ANDREWS

Connecticut farmers suffered their worst drought in history during the spring and summer of 1957. Yet the Fontenelle Farm in Southington, Connecticut, at the height of the dry spell, was able to get two cuttings per lot of high quality alfalfa by July 22. And just 28 days later a third stand, knee high, very thick, with good color was ready.

Was there some sort of mystery surrounding this accomplishment? None whatever. Directly responsible was the electric irrigation system. Farm Manager Robert Lord says emphatically that, "without the help of the irrigation system it's doubtful whether two cuttings could have been made."

The farm, owned by D. L. Sutherland, has its pasture land and crop fields split by a town road. To connect these sections, an 8″ tile pipe was sunk 5′ below the roadway. A large pond adjacent to the road made an ideal location for the pump house because existing electric lines were located nearby.

If the pond at the road were pumped continuously in times of drought, the water level would lower considerably and fish life and vegetation in the pond would be endangered. To prevent this a small pond was dug in a swampy area at the lower end of the farm, some 1700 feet from the main pond. Water in plentiful supply was pumped from the lower pond to maintain a high level in the upper pond.

PUMP located at lower pond lifts water to upper pond, maintaining desired water level for fish life and vegetation. 5 hp motor is controlled from main pumphouse.

Maintained High Milk Yields

Main lines are all 6″ underground tile from the pump house to the fields. Submains and laterals are light-weight aluminum above ground. Sprinklers are of the gun type.

Irrigating on the Fontenelle Farm is done in five acre plots. A four acre irrigated plot was used continuously to pasture 28 head of milking cows with no added outside feed. The quality and quantity of milk was maintained throughout this period. With such results as this, Farm Manager Lord highly recommends electric irrigation to maintain high yields with a minimum of labor and operating costs. □ □

Mechanized Feed Handling Pleases all Concerned

Chores are reduced, animals are supplied with ever-fresh feed . . .. all at an economical cost per feed unit

By REX B. SPRINGSTON

Everyone who has installed them is real happy with modern, mechanized feed handling systems. George Garner of Roanoke Rapids, North Carolina is especially happy because his feed processing and feeding installation has reduced the labor necessary for producing choice market hogs. The hogs are happy because high quality feed, fresh water, and shelter are always available.

Garner's installation utilizes an old three-room tenant house and a newly constructed hog parlor adjacent to the tenant house. One room of the house contains self unloading bins capable of holding 10,000 pounds of grain. The other rooms of the house are used for grain and feed storage. The self unloading bins can be filled by a portable auger conveyor direct from a truck or from the storage rooms.

Operation Centers Around Grinder

Under the house, which stands about 4½ feet above ground level, a 2 hp electric mixer-grinder unit is mounted on a concrete slab. Grain and supplement from the bins above are metered, mixed, and ground by this unit capable of handling up to four feeds automatically.

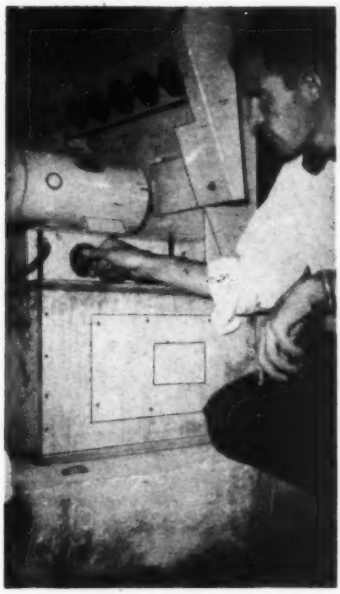
A permanently mounted auger conveys ground feed from the grinder unit to a feed sacking station within the tenant house. At the sacking station feed can be either sacked or sent direct to an automatic hog feeder by way of an auger conveyor. The hog parlor which houses the automatic feeder and waterers has a sloped concrete floor to facilitate washing.

Materials for the installation including grinder, motors, augers, water pump, lumber, and electrical wiring cost less than $900. Estimated labor for the entire job is $500. In short, the entire system cost less than $1400. Garner figures the costs for grinding, mixing, and handling will be 30% less for his present herd of 300 hogs than it was for the original 150 even though twice as much feed is handled.

The advantages of Garner's installation include:

- lower cost per unit of feed processed
- less labor involved in handling of grain and feed
- better quality feed since it is ground and used while fresh.

Garner says, "My objective is to utilize my farm and its resources to get a better return. This setup is certainly doing that." □ □



INGREDIENTS for feed are metered, mixed and ground by this 2 hp combination mixer-grinder unit located under storage bins.

AUGERS play an important part in Garner's feed handling. They carry ingredients to grinder and move feed away.

MRS. RICE pauses to watch the marvel of their converted poultry choring operation. Tasks which formerly consumed hours a day are now done mechanically and automatically.

"We Converted for Efficiency"

Time studies revealed where our operation was robbing us of profits

By LOUIE WEBB*

Which came first the hen or the egg? No matter! The hen is the means to an egg and therefore its care and comfort is the primary concern of Bob and Mary Rice, Newton, Michigan.

Efficient production and profitable marketing are the foundation of a successful egg business. When asked how she would improve their business Mrs. Rice replied, "Just one way. I would build another poultry house and double the size of the flock."

The Rices weren't always so enthusiastic, however. In 1954, prior to the construction of the modern building which is now their "egg factory," they were caring for 550 hens in two houses.

By their own admittance the housing was poor—dirty, inefficient, unsanitary, unhandy, cold and wet. Time studies taken under the direction of their county agricultural extension agent showed a dismal picture: 550 dirty birds were producing 24 dozen (52%) eggs per day, unhandy feeding procedures consumed 58 minutes per day, watering another 38 minutes; three trips each day between poultry houses ate up another 27.

No Profit in Inefficiency

Besides the hens weren't happy. Their production told the story—52%. The Rices weren't overjoyed either—the egg business outlook looked dismal.

Egg production technique studies further revealed that the 24 dozen eggs took 37 minutes per day to gather. Cleaning, 77 minutes, grading and packing, 23 minutes or five minutes and 42 seconds per dozen. The problem became apparent—egg production from hen to market was inefficient.

Could it be corrected? Their county agent believed so and the Rices were willing to cooperate. A contented layer is a profitable producer. This was then the program—buy the best birds, feed them a good balanced ration, keep them clean and dry, and clean and pack and market the eggs as quickly as possible for the highest price obtainable. And do it with as little labor as possible.

The first step was to construct a 1200-bird cinder block house. A litter cleaner, powered by an electric motor, was installed through the entire length of the new building. Roosts were placed above it. The automatic

*Mr. Webb is County Agricultural Agent, Calhoun County, Michigan.

feeders and waterers were mounted on the roosts. This setup concentrated the droppings in an area over the gutter cleaner. It can be cleaned automatically in an hour.

Fans Create Healthy Environment

Now, both feeding and watering are automatic. Periodically, the click of an electric switch and the whirr of a motor precedes the movement of mash down the long feeders. Curious hens climb to the roosts and fill themselves with feed. Feed wastage has been cut an estimated half ton of feed per month. At $75 per ton, this amounts to a savings of $450 per year.

"You can't imagine how nice it is," says Mrs. Rice, "no more feed carrying, no more water buckets."

Eggs are still gathered three times a day. But there is a difference—the laying house setup which includes two 12" ventilating fans, keeps humidity down and the litter stays dry. Result—eggs are cleaner, take less time to process.

"This was a terrible chore with the old coops," Mrs. Rice recalls, "every egg was a mess. You have to produce a good quality, tasty egg for today's market. Under our new arrangement we can do this.

A stop watch check on the new setup revealed several interesting facts. They are now caring for 1200 layers. The flock produces at 70%. Feeding, confined to dumping mash in the hopper of the automatic feeder, takes .6 minutes each day (remember the old way took 58 minutes). Watering takes no time—an electric pump keeps the pressure in the water lines; the hens help themselves.

Time saved at these chores amounts to one hour, 55 minutes each day. A grand total of 700 hours per year. Fascinating!

The time required for handling the finished products—the eggs—cleaning them with luke-warm water and sanitizing agent, grading them in an electrically powered grader and candler, and packing in cartons was cut in two. A dozen eggs are now processed and ready for market in 2 minutes and 43 seconds—a saving of three minutes per dozen or 1000 hours a year.

Dollars and Cents Tell the Story

That's a total of 1700 hours per year. At one dollar per hour, this is a saving of $1700 dollars. Another $150 was saved in truck costs by cutting down the number of feed hauling trips and feed saved amounted to $450. Total saving—$2300.

Production capacity was increased 1000 dozen per month; 12,000 dozen per year. At $.45 per dozen this amounts to $5400 additional gross income.

"With our eggs being marketed daily," Rice says, "quality and prompt delivery are of utmost importance. We are getting both now." □ □

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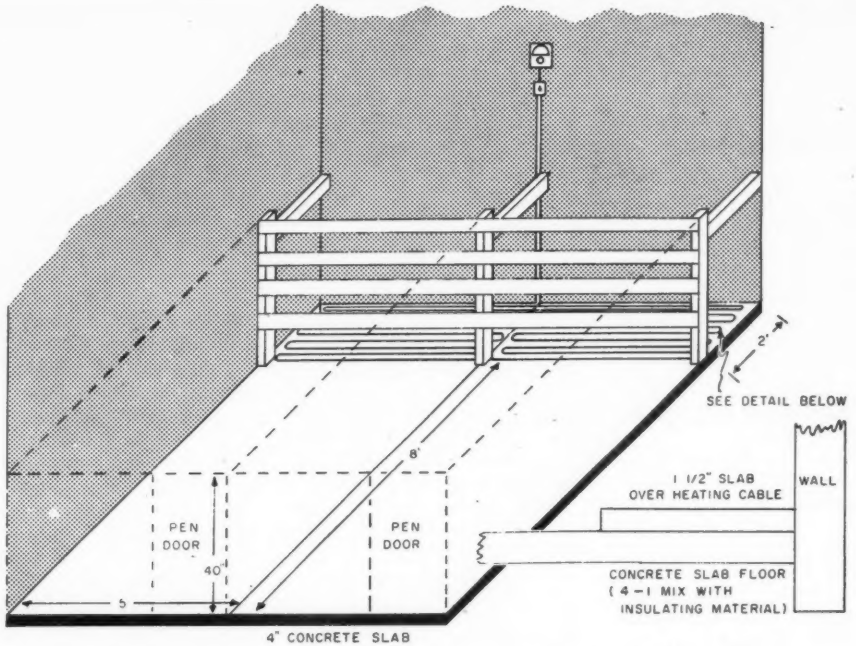


HEATED CREEP AREA is provided by embedding 200 watts of heating cable in each stall area at rear of pen. Frame fence allows pigs to crawl under but keeps sow out so there is no danger of her crushing the little pigs.

If baby pigs could talk, they'd tell us how pleased they are with

Warm Beds to Lie On

By JUEL B. NELSON

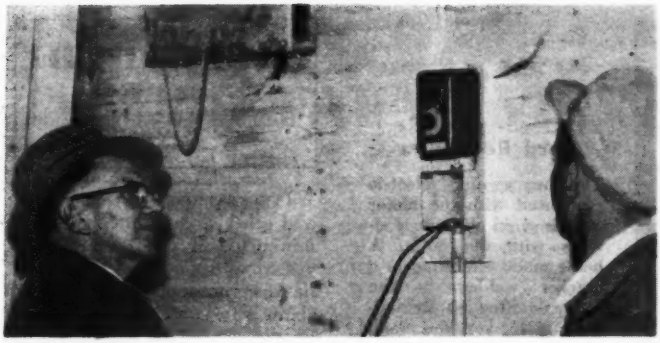
Last fall, Floyd Doppelhammer of Emmons, Minnesota was confronted with the task of designing and building a new hog farrowing house. He wanted the most practical unit possible for his investment. After much careful study and consideration, he decided that the relatively new method of underfloor heat was for him.

Floyd devoted considerable time and thought to the planning stages. He wanted to raise between 150 and 200 pigs in the house each year. He knew that winter farrowing in Minnesota's climate could be quite a problem. But to capitalize on the high May and June markets, he must farrow pigs in December and January.

Extra Heat Saves More Pigs

Research findings reviewed by Floyd showed that, without any doubt, some form of supplemental heat would be needed to save and raise the most pigs per litter. And he didn't want to reduce his overall efficiency by needless loss of pigs due to chilling.

Floyd investigated several methods of providing the needed heat. After considering such factors as efficiency, cost of installation, and safety, he decided to use underfloor heat in his eight farrowing pens. He would provide the heat by means of elec-



WALL THERMOSTAT controls heating cable in each pair of stalls. Box below thermostat contains switch and fuse to control and protect the circuit.

tric heating cables embedded in the concrete.

Having made the decision regarding heating, Floyd went ahead with the construction of his new hog house. It measures 24 foot by 46 foot. The lower wall sections, from the footing to a height of 48 inches, are of 8 inch clay tile. This is topped with wooden construction. The house is completely insulated and ventilated mechanically.

The building has a four foot walk down the center of the building for convenient cleaning and feeding. Each pair of stalls is equipped with automatic, electrically heated stock waterers to provide plenty of water.

Two rooms, one on each side of the walkway, at the end of the barn are used for housing feed and special equipment. Among other things, Floyd has his record books in one of these rooms. These tell him, at a glance, what everything is costing him in the operation. And his figures on cost of supplemental heat look mighty good to him right now. □□

CABLE, fastened to a grid made from chicken wire netting, is placed on subfloor and 1½ inches of finishing concrete is laid over it.

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Motor mounting provides weight and leverage with no loss of power. Twin drive wheels "propel" Unloader without twisting or jamming.

Telescoping adjustments allow use in 2nd and 3rd silos. Proven ability — to handle frozen silage.

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Cord Reel Idea

The heavy duty electric cord used with the motor on this grain elevator is always with the outfit. A home made reel fitted in a bracket welded to the frame does the job. By pulling a cotter key, the crank may be pulled out of the pipe core of the reel, allowing it to be used elsewhere. A flat iron plate with a pipe nipple welded to it for a hub and spacer is bolted to each side of the reel.

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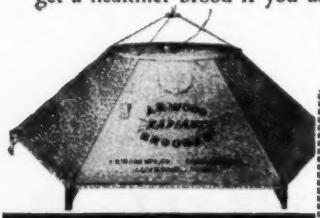

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RESEARCH NOTES

By J. P. SCHAENZER

INFESTATIONS of rice weevil and other storage insects can be minimized if the corn is harvested as soon as it is mature, has a kernel moisture content of about 30%, and is dried mechanically say the entomologists of U.S.D.A.'s Agricultural Marketing Service. . . .

An automatic load regulator for a 5 hp feed mill requiring no human attention has been developed by R. W. Mowery, Agricultural Engineer, Univ. of Ill. To prevent clogging it stops the flow of the grain with the hammer mill. . . .

Harper Adams Agricultural College, Newport, England has found it possible to house two flocks of laying hens in a completely darkened poultry house as a day shift and night shift and thereby doubling the capacity of the house. . . .

Grass-land produced green-chopped feed is used more efficiently by dairy cows and may be more profitable than grazing the animals reports Agricultural Economist, K. H. Myers, Pennsylvania State Univ. . . .

Dr. W. E. Petersen, Univ. of Minn., reports that for identical twin cows milking up to 10,000 pounds on twice-a-day milking for 305 days, no effect was observed on production when the milking interval for the night was 14 hours and that for the day period 10 hours. . . .

Commercial orchards when irrigated, such as peaches, have produced 50 percent more fruit of marketable quality than unirrigated in the same orchard writes N. H. Wooding, Jr., Pennsylvania State University.

GOOD FARM WIRING MEANS

Proper selection and application of wiring materials and devices used in accordance with governing wiring codes and regulations

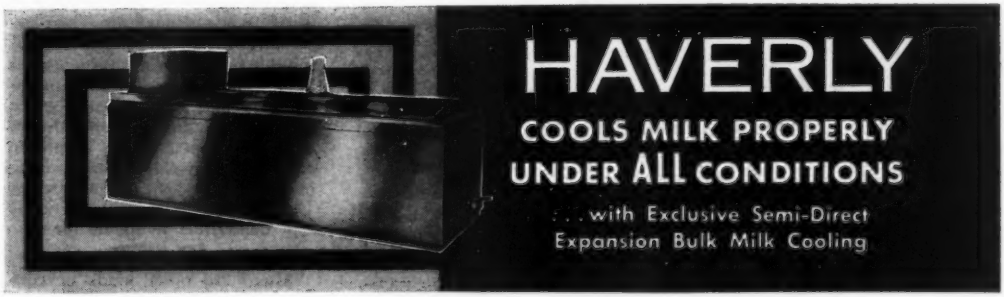
By H. H. WATSON

It is a reasonably safe assumption that you are reading this article on a winter evening by the light of an electric lamp. From that lamp back to the place where the power company generates electricity there is an incredibly complicated network of wires, cables, meters, switches, transformers and circuit breakers. Each of these elements of the complete system must perform its function continuously if you are to enjoy the benefits of that electric lamp without interruption.

If any part of the total system should fail to do its assigned work the pumps, milking machines, crop driers, poultry brooders, freezers and all the other electrically powered equipment would stand idle. Although most of this electrical system is owned and operated by the power company, you, on your farm, own and are responsible for a very important part of the total system, your farm wiring system.

The farm wiring system is made up of three kinds of materials. These are conductors, connecting devices, and control and regulating equipment. By conductors we mean simply wires and cables. A typical connecting device is the convenience outlet into which a portable drill is plugged. Examples of control and regulating equipment are wall switches for lights and circuit breakers for power to the barn.

It should be understood that what is being talked about in this article is a wiring system that meets the safety requirements of the National Electrical Code and makes use of materials and equipment having the approval of Underwriters' Laboratories, Inc. or the equivalent. Also in any particular area there may be State electrical codes and even requirements of the particular power company involved.



Only Haverly's exclusive cooling principle assures fast cooling without freezing and safe, proper cooling without mechanical refrigeration in emergencies. Haverly's copper heat exchangers draw heat from milk 24 hours a day and give continuous cream line cooling. Milk temperatures always go down — never up between milkings. Low blend temperatures and slow, natural agitation protect milk quality and quantity — guards milk flavor. Haverly saves money, too. Low operating cost. No special wiring required.

Haverly Bulk Milk Coolers are backed by 90 years of John Wood quality manufacturing experience.

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City_____ State_____

NEW FILM giving inside facts on bulk milk cooling now available for showings — write for details.

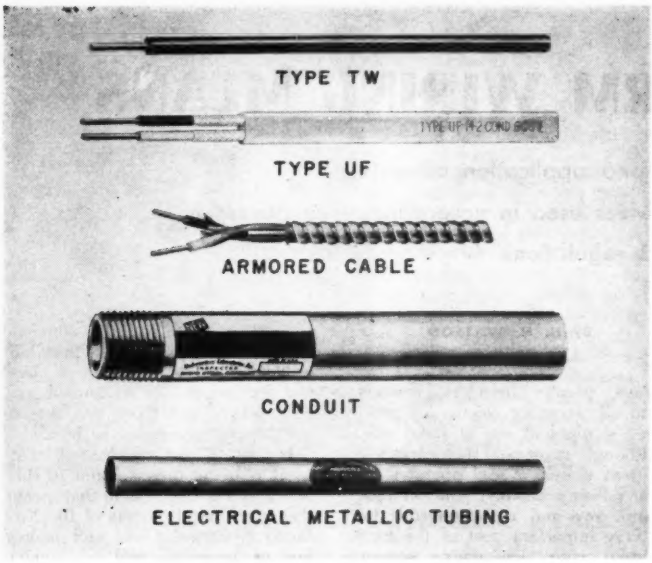
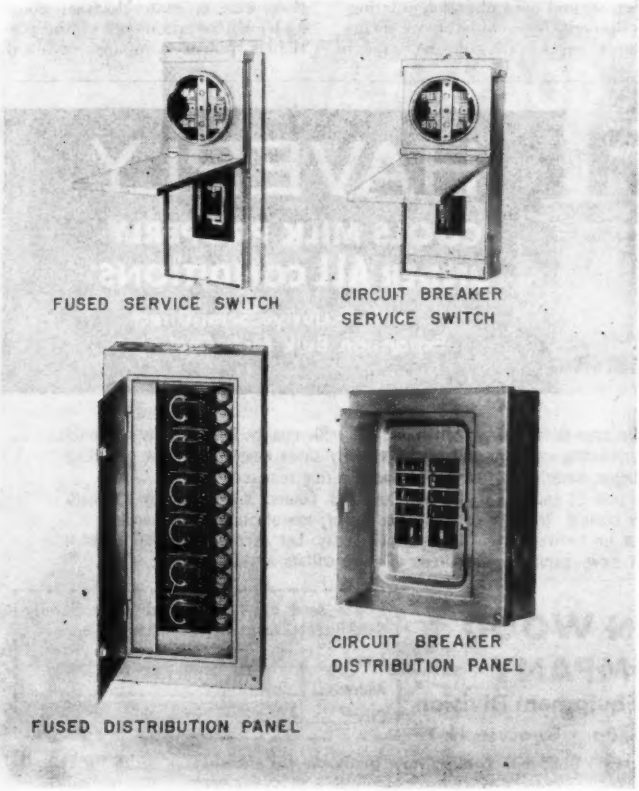


Figure 1, above; Figure 2, below



However, the fundamentals are the same and it is these fundamentals about which we are concerned here.

CONDUCTORS

Electricity as it is used on the farm and in the farm home is delivered from place to place by copper wires which are provided with a covering. This covering serves the dual purpose of keeping the electricity from leaving the wire accidentally and protecting the wire from mechanical damage. The covering also provides safety by preventing contact with the wire by persons or animals. Recently aluminum has been introduced as a substitute for copper. It is expected that the use of aluminum wires will increase as it has some desirable characteristics.

The covered wires, known generally as insulated wires, are made in a great variety of types for the many different uses and conditions encountered. The wire may be as simple as a solid piece of metal with a single plastic covering which provides both electrical insulation and a degree of mechanical protection. Such a wire is known as Type TW and is shown in Fig. 1. This Type TW wire is made in sizes from 15 amperes up to very large sizes rated in thousands of amperes. The plastic covering on Type TW wire is suitable for the highest voltage used in farm wiring and is resistant to moisture and to practically every other deteriorating influence except gasoline. A special type of plastic covering is available for gasoline exposure.

Conductors Available for Any Usage

There are other kinds of conductors manufactured which serve the same purpose as Type TW. Among the rubber compound insulated conductors are Type R for general use, Type RW suitable for wet locations and Type RH for use where the temperature is above average. There are also varieties of wires for specific conditions.

On the farm, none of these types is ever used without some added support or protection. They are most always combined in cables or pulled into conduits. In the earliest installations made 40 or more years ago, single wires were supported by porcelain knobs and pulled through porcelain tubes in partitions. This method of installation has generally

been replaced by the use of armored cables or non-metallic sheathed cables in which the required number of wires, generally two or three, are combined in a single factory fabricated assembly providing a complete circuit run in one item. These cables consist of the proper number of Type TW or Type R wires and a mechanical jacket made of either a metal armor wound on, a fabric jacket woven on, or a plastic or rubber-like jacket molded over this insulated wire with some added filler material for strength against crushing or impact. You know these materials by the names BX and Rome-X which are the trade names of particular manufacturers.

One Type Cable for Entire Farm

For the severe corrosion conditions in dairy barns and other wet places a better grade of non-metallic sheathed cable known as Type NMC has been used now for about 10 years. This is often called barn-wire. Barn-wire is also suitable for general-purpose wiring in all other locations.

Because it is frequently desirable to bury directly the wiring underground between buildings, another type of cable has been developed. This is called Type UF which means underground-feeder cable. Type UF should be buried deep enough to be free from damage from traffic over the ground or from possible damage by plowing or cultivating. Type UF is frequently interchangeable with Type NMC which means that a single kind of cable can be used for all farm wiring.

Metal Armor Provides Grounding

Metallic armored cable can be used wherever severe moisture and corrosion is not expected. It has the advantage of being somewhat more resistant to most mechanical damage. Its continuous metallic armor also provides the grounding circuit necessary in many farm circuits. Metallic armored cable is entirely satisfactory for wiring the farm home.

Another method of installing wires is to use steel conduit. This is simply a pipe approved for electrical use into which the wires are pulled after the pipe has been put in place. These pipes may be rigid steel conduit which is not unlike water pipe although made to much more exacting specifications or a somewhat thinner steel pipe called EMT or electrical metallic tubing. This method of installation provides the maximum of mechanical protection and makes it possible to renew or replace the conductors without disturbing the building structure. It is particularly desirable for larger wire sizes and for wiring in areas where maximum protection against fire is desired as in hay or grain storage areas. Fig. 1 shows conduit and EMT.

CONTROLS

We frequently overlook one of the greatest advantages of electric power. It is that electricity can be controlled instantly, accurately, and with a very minimum of effort. Only too often this great advantage is not used effectively on the farm, perhaps because even a minimum use of control satisfies a large number of needs.

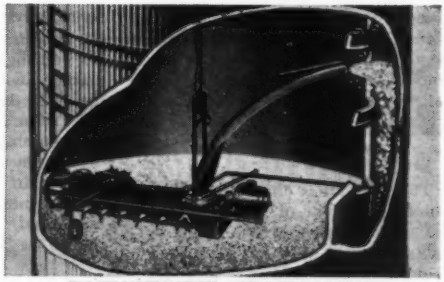
Under the heading of controls are included switches, circuit breakers, timers, fuses, distribution equipment, panel boards but not the specific items like motor starters which are part of the chore equipment rather than a component of the wiring system.

Service Equipment Provides Capacity

There are many variations of the method of proceeding on from the meter to the various loads on the farm. It is general practice to use a switch at the meter which will disconnect all the farm load except the water pump. Included at the switch location are fuses or a circuit breaker may be used to combine the functions of both switch and fuses. Such equipment is shown in Fig. 2.

From the yard pole, feeder circuits are run to each building either overhead or underground. These circuits, of proper size for the load in the building to be served plus a liberal allowance for future growth, terminate in other service entrance equipment located in the served

Planning to Modernize your farm? Interested in ways to save money, enlarge your herd, and make your life easier by mechanizing livestock operations? Write to Clay Equipment Corporation for free idea books for planning mechanized feeding, barn cleaning, milking parlors, crop driers.



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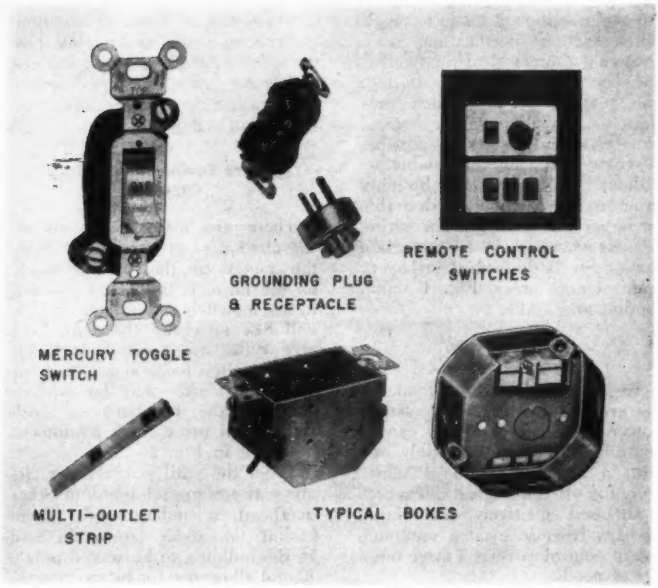


Figure 3

building. This equipment has provision for supplying the various branch circuits in that building. Again either fused switches or circuit breakers may be used. Typical assemblies are shown in Fig. 2.

Switch Control Systems

The individual circuits are then run to the point of connection of the equipment served such as lights, permanently installed machinery, pumps, and to outlets for plug-in connections. The familiar wall switch (Fig. 3) is the last device in the chain of control to a lamp. This switch can be a single switch in the lampholder operated by a pull chain or it can be a set of three-way switches to allow the lamp to be turned on and off from the two ends of a barn or the two doors in the living room. There are also time switches, often used for poultry house lighting.

An important variation in control is the use of one of the several remote-control switching systems now available. In remote-control switching shown in Fig. 3, the actual operation of the switch in the lighting or power circuit is by a low-voltage relay system which makes it possible to turn lights on and off at a considerable distance from the lights and from a number of different locations. The remote-control system also provides for the simultaneous control of a number of lighting circuits from a master switch. For example, all the lights in all of the farm buildings, or in any one of the buildings or even single lights can be either turned on or off from a bedside location in the farmhouse. This in no way interferes with the optional individual control of the lights within the building itself.

Fuses or Circuit Breakers Provide Protection

Much has been said about the relative merits of fuses and circuit breakers. From the standpoint of cost there is relatively little difference. When a fuse blows to protect the wiring or some piece of electrical equipment the fuse has to be replaced while a circuit breaker is reset by merely operating a simple lever. On the other hand, for ultimate durability the fuse has some advantages in that it is relatively free from problems arising from corrosion, dust, or moisture. Both types are in use in farms in all sections of the nation and both are approved by nearly all inspection authorities.

In considering circuit controls, it is important to remember that fuses and circuit breakers are put in the system for the protection of *your* life and *your* property. They should never be subjected to tampering and should be treated as the devices on which your life, your family's lives and the safety of all your property may depend. The basic rule is that wherever a circuit wire is reduced in size it must be protected at that point of reduction by a fuse or circuit breaker suitably rated for the smaller wire size. As the circuit to your lamp progresses from service drop, to feeder, to branch circuit, there are overcurrent devices at each point of reduction.

CONNECTING DEVICES

So far, we have talked only about the conductors and the devices which control the flow of electricity from the power company's lines to the equipment. Very important elements of the complete farm wiring system are the devices used to provide connections. Wire is not merely connected to motors —the armored cable must terminate in a proper connection box providing room and protection for the splice between the circuit wires and the motor controller.

Outlets for Maximum Convenience

The lamp we have been talking about requires a lampholder or socket into which it is screwed. Portable drills, portable chore equipment, the electric waffle iron and the transformer on Junior's toy train all are provided with flexible power supply cords and plugs. There must be available an adequate number of convenience outlets conveniently spaced and located for receiving these plugs. Not only are these outlets needed throughout the farm, they should also be installed in the several sizes and ratings to take care of both the small 115-volt loads of lamps and the large loads such as the 50-ampere, 230-volt used by a farm welder.

Circuits of any type originate and terminate in an electrical connection of some kind. These terminations are the most frequent source of exasperating power failures because the installer so often does not realize the necessity for making a professional kind of connection. Splices and connections should always be made in proper

junction boxes or within the connecting enclosure provided on the equipment. Switch and outlet box covers and plugs should always be kept in place to avoid shock hazard and damage. Fig. 3 shows some of the kinds of boxes used for this purpose. Because there is so much use of non-metallic cable on farms, non-metallic or plastic boxes of good design are readily available.

Grounds for Portable Tools

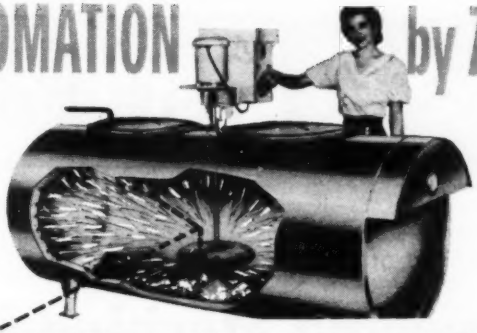
ELECTRICITY ON THE FARM has repeatedly stressed the need for using proper grounding wherever the person using portable equipment is likely to be standing on the ground or on a wet or damp floor. All outlet locations on the farm, except perhaps in the farm home, should provide for the plugging in of grounding-type plugs. Fig. 3 shows this type.

In addition to regular outlets, there are available assemblies of outlets in strips which provide an outlet location at frequent intervals around a room, a shop or other location where several different portables are used frequently. Fig. 3 also shows this type.

Of particular interest for farm wiring are surface wiring devices in which the switch or outlet is combined with the non-metallic box into a single product. These devices are especially suited to surface wiring or exposed wiring. One brand is so made that the stripped ends of the non-metallic cable need only be pushed into self-locking terminals for complete connection. Figure below shows this device. □ □

SIMPLIFIED connections are made by inserting stripped wire end into pressure locking terminal. No screws are used.

AUTOMATION by ZERO



TORNADO in Milk Tank CUTS CLEANING Time!

The girl above, with a touch of her fingers, controls a tornado . . . an automatic, *cleansing* tornado in a farm milk tank. Simply turning a control knob starts Zero's Spatter-Spray washing up for you. This exciting new labor-saver is attracting national attention.

Exactly the same design features that have always made Zero's round vacuum tank easier to *brush* clean make it possible today to wash *automatically*. It's a logical development of Zero's Super Strainer, direct cow-to-tank hook-up, and other Zero labor-savers.

Mechanically, it's simple. The variable speed motor turns the agitator at low speed during cooling, at a faster speed for butterfat testing. When the tank is empty the agitator spins at top speed . . . to wash, rinse and sanitize.

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Electricity in
THE FARM HOME
EDITED BY ELINOR C. WUEHRMANN

Make the Most of Your

Sewing Machine Attachments

Professional results at less cost will be achieved

This is a success story. It is the story of one young couple, married while still in college, yet could be the story of many such couples throughout the country.

Joel and Ruth Ann Davis met and were married while attending college in Wooster, Ohio. After graduation they came east to the charming town of Guilford, Connecticut where Joel's parents operate a dairy farm. Joel helps his Dad run the 40-cow dairy and also teaches History at the local high school.

Now, 7 years later, two little Davis', Keith, 5 and Becky, 2, have been added to the family. There is also a charming new home, which Joel built himself out of native materials.

But Joel Davis is not the only ambitious and talented member of the family. Ruth Ann has worked right beside him with paint brush and hammer. The house was started in November, 1954 and was ready to be lived in a year later.

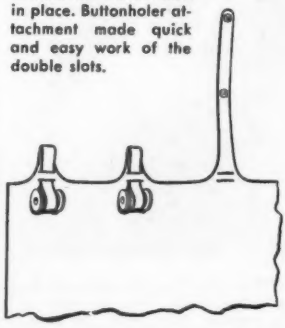
Their home reflects the pride and love that has been put into it. Every bit of material in it, every piece of furniture, has a story of origin.

Interior Decorated

Ruth Ann and her sewing machine have and still are playing an important part in the interior decorating of their home. Throughout the house, curtains, draperies, slipcovers and the many other things that make a house a home bear Ruth Ann's touch.

She is an excellent seamstress and has made some really clever and beautiful things for their home. Ruth Ann says, "Don't credit me with the professional-looking finishing touches on our home-sewn furnishings. All I did was select the right attachments for my sewing machine and guide the fabric through. I've got quite a collection of attachments now and am adding to it all the time. By proper use

COLORFUL café curtains add a bright touch to the Davis' dining nook. A whimsical note is added in the form of empty spools, painted and used to hold the curtain tabs in place. Buttonholer attachment made quick and easy work of the double slots.



HER HUSBAND may be the expert at home construction, but when it comes to decorating, Ruth Ann and her sewing machine are the experts. Here she whips up some placemats, using the multiple slotted binder attachment.

of the right attachment, even a very amateur sewer can get professional results."

The biggest problem Ruth Ann had in decorating the home was the huge window in the all-purpose room. The window covers one entire wall of the room. Sun pours in there most of the day, which is cheerful—but hot in the summer. She felt that she would like the window covered at night, too, for that cozy feeling.

As Ruth Ann says, "Frankly we couldn't afford to have this job done for us. It would have been terribly expensive, and we've had so many expenses lately. So I decided to tackle the job myself. The fabric selected had to be durable, easy to work with and absolutely colorfast. I finally chose an avisco rayon. It is guaranteed fade-proof so I have no worry about the sun changing the color. Besides that it has a silicone finish for extra durability. I was lucky enough to find a color that just matches the walls, so it gives the room a more spacious feeling. I used the buttonholer, gathering foot, cloth guide and overcaster attachments in making them. We're real pleased with the results."

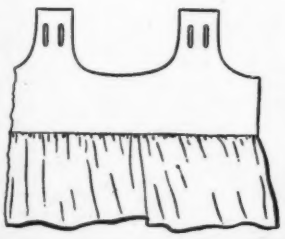
We agreed that Ruth Ann had every right to be extremely proud of the results. The draperies are lovely, as are the curtains throughout the rest of the house.

Directions Available

The Davis' have both worked very hard on their little home, but it has been well worth the effort, as is any family project for home improvement.

If any of our readers would like complete directions on making either the draperies or the kitchen café curtains we would be glad to supply them, free of charge. □ □

FULL WALL of draperies adds warmth and beauty to the Davis' all-purpose room. Ruth Ann made the draperies, at a considerable savings, with the help of her sewing machine attachments. The rod runs through vertical buttonholes in the tabs, thereby eliminating expensive hardware.



WHERE ELSE but in an all-electric kitchen could a unit like this be found? This one complete unit contains a combination washer-dryer, dishwasher, built-in oven, surface units, sink and garbage disposer. It also has plenty of convenience outlets, a built-in radio and storage space. Looks luxurious yet costs less than all of these appliances would if bought separately. Use this unit against a wall or, as shown here, as a room divider. Wiring is greatly simplified by installing such a unit.

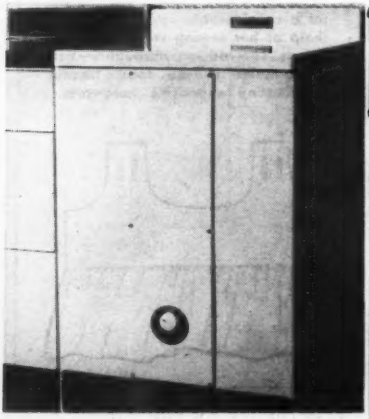
Here's what modern farm homemakers want and are getting in

All-Electric Kitchens for 1958

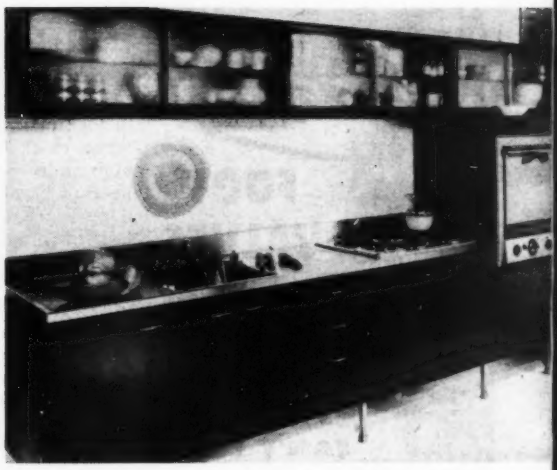
HOME LAUNDRY appliances are styled for blending into any all-electric kitchen. They are trim in line, counter high and wide, and are available in decorator colors.

KITCHENS are of great importance to American homemakers, and rightly so. They have definite ideas on what they want and do not want in their homes. But almost without fail they are thrilled with the idea of an "all-electric" kitchen.

EVEN automatic electric water heaters are produced in counter-top models for installation in all-electric kitchen and laundry assemblies.



REFRIGERATOR and laundry center are built into this free-standing unit. A frame supports the refrigerator and freezer above the counter top. Below there's lots of room for cabinets or an under-counter combination washer-dryer.



CABINET manufacturers cooperate with electric appliance manufacturers to produce beautiful and durable cabinets that are standardized for easy installation of built-in appliances. That "custom look" at mass production prices.

What does an all-electric kitchen have to offer?

Complete Automatism, flexibility and safety, making her work as homemaker and mother easier and more enjoyable.

Beauty, which is important in today's home where the kitchen is very much a focal point. Colors are coordinated between appliances, cabinets, utensils and accessories.

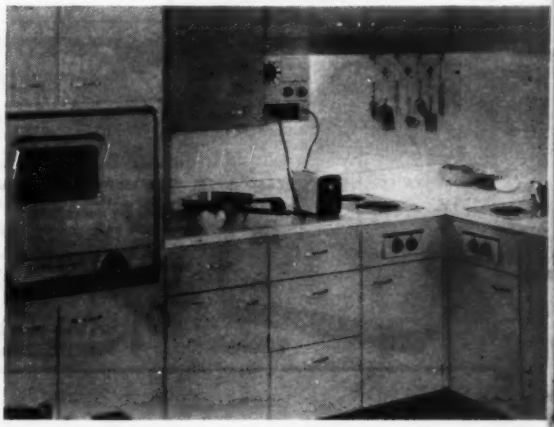
Clean, trim lines of new appliances blend with cabinet design making even free-standing appliances look built-in.

One power source simplifies installation and eases bookkeeping tasks. Since only manufacturers of electrical appliances can supply a complete kitchen more and more of our homemakers are going all-electric. Kitchens can now be purchased the way a dining or bedroom set is. All of the pieces made by one manufacturer—all matched in style, color and, in this case, source of power.

Future developments are nearly all in the electrical industry. Electronic ranges and a host of other new ideas, some on the market and many more on the drawing board, are in the near future. The all-electric kitchen is wired for these new developments. The owner of an all-electric kitchen is prepared for them. She is now working with the best today has to offer and is ready and eager for what will be developed tomorrow. Only an all-electric kitchen is a truly modern kitchen. □ □

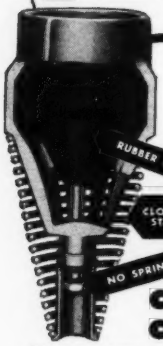
THIS YEAR more than any other will see free-standing appliances with squared-up, trim lines. When placed in a row of cabinets, ranges and refrigerators particularly will have the coveted "built-in" look that is so popular.

PORTABLE appliances are assured of adequate power when an automatic appliance center is installed. This one not only has plenty of outlets ready for use at one time, but also has a timed clock to make any appliance automatic.



Strataflo

FOOT VALVES



EIGHT SIZES
Many pump manufacturers use Strataflo as original equipment.

CAN'T STICK
CAN'T LEAK

STRATAFLO Foot and Check Valves end leakage troubles, save wear and tear on pump and save their cost in service calls. They are ideal for jet-type pumps.

Write for Bulletin 902

STRATAFLO PRODUCTS, INC.
Fort Wayne, Indiana

AUTOMATIC ROLLER MILLS

CRACK, CRIMP OR CRUMBLE GRAIN for BETTER FEED

For cheaper, faster gains feed fresh, palatable, dust free grain and boost your livestock profits. The AUTOMATIC Roller Mill is trouble free, simple to operate and guaranteed. Twelve sizes and models available.

AUTOMATIC
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Helpful Hints

Next time you have people in for lunch or supper why not serve chicken a la king over high, puffy popovers? You don't need to be afraid that the popovers won't survive those crucial last few minutes if guests are a little slow getting to the table. Just let your Freezer take the guess work out of serving for you. Make the popovers up well ahead of time—several weeks, perhaps—freeze them and come party time, your results will be sure-fire.

The rubber or plastic seal around your freezer door or lid must be kept clean to do its job efficiently. Wipe it often with a sudsy cloth, rinse, and wipe dry.

Utensils with tight-fitting covers give best results.

Cookies and biscuits brown more evenly and rise better when baked on sheets instead of in pans with high sides.

Warped and discolored pans result in uneven baking and browning.

Leave at least one inch of space between pans, and between pans and oven walls. This allows for even heat distribution to give uniform baking results.

4-H Club Dress

PRINTED PATTERN

Make this 4-H Club Dress for this season's activities. This is the official design with easy-to-follow directions. Printed Pattern 4619 comes in Misses' Sizes 10, 12, 14, 16, 18; Junior Miss Sizes 11, 13, 15. Size 12 dress requires 4⅛ yards 42-inch fabric. Instructions for crocheted beanie are included in pattern.

Send THIRTY-FIVE CENTS (in coins) for EACH pattern to:
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IN CANADA: PATTERNS ARE FORTY CENTS EACH.
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Add FIVE CENTS for EACH pattern for First Class Mailing.

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"TWO RANGES IN ONE"—Bake with COAL-WOOD or OIL alone, ELECTRICITY alone, or in combination . . . one oven for any of these fuels.
No guess work . . . set the dial to desired temperature and electricity is automatically added to hold the heat set. Double cooking surfaces. Kitchens are COZY in winter—COOL in summer with America's finest and most beautiful MONARCH combination ranges. See your dealer today.

Monarch SINCE 1896
MONARCH RANGE CO.
7028 Lake Street
Beaver Dam, Wis.

CARPETING is a large investment in any home. It's only good sense to give it proper care. A good vacuum cleaner, used regularly, assures added years of carpet life.

LINOLEUM TILE is no problem for the family that owns an electric scrubber-polisher. Teen-age Sue Black is delighted that her Saturday chores now go so quickly.

Take the Backache Out of Housework

Scrubber-polisher and vacuum do efficient jobs with minimum effort

By MARION E. RYAN

Flesh and blood hired girls have gone the way of wooden butter churns and kerosene lamps on most farms today. Now farm wives have more dependable, harder working hired girls in their electric appliances.

Even when it comes to floor care, electric servants have taken over. Pleasant, stand-up exercise eliminates aching back and sore knees. The vacuum cleaner and electric scrubber-polisher are the appliances that have done it!

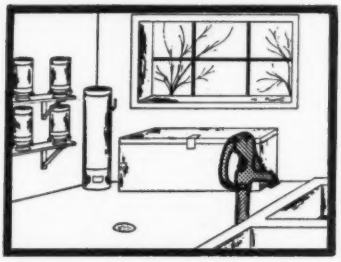
In the Fred Black home, Akron, Michigan, there are three types of floors to care for—rugs, hardwood and linoleum. Linoleum tile, matching the kitchen floor, was chosen for the dining room because most household traffic passes through this room. Mrs. Black's electric scrubber-polisher makes it easy to keep the tile in both rooms glistening.

She gives the linoleum a thorough scrubbing with the lightweight machine, then it is polished with a paste wax to a hard, shiny surface. The floor needs scrubbing and polishing only occasionally. Between times, a quick buffing with the polisher retains the sparkle.

Elsewhere in the Blacks' home you'll find attractive hardwood floors. They have such a rich, gleaming appearance you'd think hours were spent in caring for them. Yet, Mrs. Black says it's only a matter of minutes for her or her daughter Sue to wax and polish them with the polisher.

Carpets and rugs in the Blacks' home are effortlessly cleaned several times a week with their vacuum cleaner. The frequent use of this appliance prevents dirt, dust and grit from working down into the rug fibres, thereby prolonging their life and beauty. The vacuum's attachments make light work of dust pick-up on hardwood and linoleum surfaces.

Two household appliances—a vacuum cleaner and an electric scrubber-polisher—can be purchased for a hired girl's two month's wages. They do the scrubbing, polishing and cleaning better than she could, can be fed for only pennies a day, and stay on the job for years. □□



RUNNING WATER
Outside in *any* Weather

● VARI-FLO FROST-PROOF HYDRANTS give you running water in the barn, hen house, milk shed or any outdoor location. It drains after each use so it can't freeze. A new type packing gland requires NO ADJUSTMENT. Stainless steel rod prevents rusting and winter freeze-up. Can be used with standard garden hose.

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LIVE BETTER ELECTRICALLY

Electric Mama

We live on a farm and for many years used butane for our cooking fuel. But we were not satisfied with this method of cooking. The fuel was expensive, it smoked and had an offensive odor, the tank was frequently empty at the wrong time and the flame often blew out when a window or door was opened.

One day one of our friends stopped for coffee. He suggested that we switch to electric cooking as they had. When he explained that an electric range would be cleaner, that the heat went directly into a utensil, was faster, safer, surer (with no guesswork because of controlled heat), thriftier (less shrinkage and low operating costs) and healthier (because vitamins don't cook away) my mind was made up.

Very shortly after his visit we purchased an electric range. After only a few weeks of use I was convinced that everything he had said was true. Besides that I can cook a whole meal while away with my timed oven.

Before I leave the house, for example, I can put on a pot of soup in my deep well cooker and be assured that it will be the very best "electrically cooked" soup by the time the bus arrives with my five school age children.

It's no wonder my children are proud of their "Electric Mama."

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Provides warm, dry floors at low cost. Uses no oxygen. Stores heat, saves time and upkeep expense. Line-O-Heat electric underfloor heating is safe, dependable . . . and so easily constructed you could do-it-yourself. Perfect for all young stock and chicks . . . raises them easier and cheaper than any other brooding system. Get detailed information—write for Bulletin P1122 today!

WRITE FOR FREE LITERATURE — THE SMITH-GATES CORP. FARMINGTON, CONN. — IF YOUR DEALER DOESN'T HAVE IT, ORDER DIRECT

Zelda Malone sez: "A gal needs a CHAPERON until she can call some CHAP HER OWN." . . . . OVERHEARD: "What did you do with your HYENA HIDE?" "I turned it in on a GNU one." . . . . EVERSTOPTOTHINK what MIGHT have happened to American history IF the British soldiers at Bunker Hill had had BLOODSHOT eyes? . . . . . Don't YOU think a PERT airline hostess should be described as a FLYING SAUCY? . . . . . Friend of ours says he didn't realize it SOON enough but when he got married he let himself in for a HEN-PECK of troubles. . . . . The holiday season is long gone but we know several bachelors who were brought down by GUIDED MISTLETOE. . . . . OLD-TIMER: a fellow who can remember when TRASH was something that went into garbage cans INSTEAD of EXPOSE magazines. . . . . OVERHERD: "I HEAR you HERD sheep." "Yeah, that's what I HERD." . . . . OVERHEARD AGAIN: "Does your dog chase cows?" "No, he's a BULLDOG." . . . . LIMERICK DEPT. (Switch PARTIES to suit your politics): A REPUBLICAN, out in his motor, Ran over a DEMOCRAT voter. "Thank GOODNESS!" he cried, "HE was ON the WRONG SIDE; So I DON'T blame MYSELF one IOTA." . . . . WIFE: a woman who can tell you word for word what her grandmother said forty years ago, but forgets what her husband said at the breakfast table. . . . "What's the use of it all?" complained the sad rooster. "Eggs YESTERDAY, chickens TODAY, and FEATHER DUSTERS tomorrow." . . . . Ma Larkey sez: "Be CAREFUL what you START when you try to STOP something." . . . . CRITICISM: TOO much TELLY and not enough VISION. . . . . JANITOR: a fellow who would rather sleep than HEAT. . . . . SALES PITCH: TRADE WIND. . . . . TOUPEE: FALSE HOOD. . . . . BLACKMAILER: a man who gets paid by the WEAK. . . . . There IS one thing you can get for a nickel nowadays—FIVE PENNIES. . . . . SODDEN THOUGHT: MANY AN OPTIMIST has become rich simply by buying out a PESSIMIST. PARTING THOUGHT: Many an EXECUTIVE who is a BIG NOISE at the office is NOTHING but a LITTLE SQUEAK at home. . . . .

Your pun-peddler—DUFFY

A New Breakfast Treat

Frequently in February, our spirits need a little lifting. The best way to start your family off right for the day is to make sure that they all have a good breakfast. This first and most important meal of the day can become monotonous, though, unless we vary the daily menu.

Breakfast is well worth getting up for when flavorful Peanut Brittle Puffs are on the menu. Peanut butter enthusiasts will like the rich flavor of the puffs, which are made from a simple peanut butter beaten batter.

Peanut Brittle Puffs

- 1 package yeast, compressed or dry
- ¼ cup water (lukewarm for compressed yeast, warm for dry)
- ½ cup milk
- ¼ cup brown sugar
- 1 teaspoon salt
- 2 cups sifted enriched flour
- ¼ cup crunch type peanut butter
- 1 egg
- 3 tablespoons melted butter
- ½ cup crushed peanut brittle

1. Soften yeast in water
2. Scald milk, add brown sugar and salt and cool to lukewarm.
3. Add 1 cup flour and peanut butter and beat until smooth.
4. Add egg and yeast softened in water and mix well.
5. Add enough flour to make a thick batter, beat thoroughly.
6. Cover and let rise until bubbly (about 1 hour).
7. While batter is rising prepare muffin pans.
8. Sprinkle 2 teaspoons crushed peanut brittle over ½ teaspoon butter in bottom of each 2-inch muffin cup.
9. When batter is light, stir down.
10. Drop by spoonfuls into prepared muffin pans, filling about ⅔ full.
11. Let rise until doubled (about 30 minutes).
12. Bake in moderate oven (350°) about 15 minutes.
13. Remove from pans immediately.

Makes about 1½ dozen rolls.

The new dual-purpose Dempster Convert-o-jetmaster water system allows you to change from shallow-well to deep well (down 90 ft.) operation at little cost—*regardless of most water conditions.* Long-life, stuffing box filters out abrasive particles. Removable bronze sleeve stops wear on motor shaft for added years of trouble-free service. Choice of powerful ½ H. P or thrifty ½ H. P. motor. Delivers up to 835 gals. per hour.

- Better seal—friction free, more pumping power
- Cost-free conversion—all is furnished except pipe

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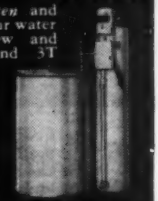

OSHKOSH FILTER & SOFTENER CO.
Oshkosh, Wisconsin

FOOD PREPARATION program winners were each awarded a $400 scholarship by General Mills. This program had as its objective the teaching of planning, cooking and serving of meals as well as educating as to the importance of eating nourishing foods for good health. Winners, left to right, are: Carol Hembrough, Jacksonville, Ill.; Corine Kimball, Pittsfield, N. H.; Jo Ann Wooden, Chattanooga, Tenn.; Marie Carroll, Beloit, Wisc.; Sylvia Smith, Decatur, Miss.; and Karen Hansen, Las Animas, Colo. This program stresses the use of home produced foods and meats.

4-H Girls Get National Awards

Winners in Food Preparation, Clothing, Frozen Foods and Canning Honored at Club Congress

CLOTHING program winners model their outfits. Each of the twelve winners received a $400 scholarship from the program's award donor, Coats and Clark, Inc. The winners are, from left to right: Luella Butts, Westport, Mass.; Faye Chastain, Athens, Ga.; Geneva Kay Helmig, Fulton, Mo.; Linda Loomis, South Otselic, N.Y.; Juanita Taylor, Heyburn, Idaho; Shirley Pike, Mullica Hill, N.J.; Mary Jean Ciruli, Boone, Colo.; Ramona Ann Vanderwork, Waukomis, Okla.; Bertha Lois Ray, Lillington, N.C.; Sylvia Felt, Wellington, Kans.; Nancy Smith, Goleta, Calif.; and Shirley Mallon, Plain, Wis. The objectives of the clothing program are to encourage girls as they acquire skills in selecting, constructing and caring for their wardrobes.

No. 2 Regular Edition

FROZEN FOODS award winners received their $400 scholarships from awards donor Whirlpool Corp. They are from left, sitting: Patricia Madison, Rising Star, Texas, and Ethel Dale, Hope, R.I.; Standing: Elizabeth Erman, Acampo, Calif.; Barbara Tew, Linden, N.C.; Jo Ann Legoski, Wyarno, Wyo.; and Marlene Boddicker, Parkston, S. Dak.

CANNING award winners each received $400 scholarships from Kerr Glass Mfg. Corp. Winners are: Ethel Wyatt, Crossville, Tenn.; Janet Cofer, Forest, Va.; Geraldine Sackreiter, Lewiston, Minn.; Kathryn Gunnell, Ogden, Utah; Naomi Fuchs, Ridgely, Md.; and Reta Morrison, Hillsboro, W. Va. Program encourages girls to develop skills in food preservation.

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ELECTRICITY ON THE FARM
Magazine

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THE C. S. BELL CO. Mfrs.
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No. 2 Regular Edition

FARM ARC WELDING

No shop is complete unless it is equipped to handle simple repair work on metal

By C. L. LAWTON

How would you repair a broken drawbar? Or, for that matter, how would you join any two pieces of steel? How do you extend the life of parts that wear out, such as plows and sprockets? How do you bend metal? Or cut it? Any of these jobs are pretty tough without a welder, but a "snap" with one.

The need to cut expenses has caused many farmers to turn to welding as a method of reducing repair bills and saving valuable time spent on trips to town. With welding, they can repair almost any broken metal part, hardsurface parts which wear out to make them last longer, and build special time and labor saving equipment to help them with their farm work. With welding equipment, a farmer also easily cuts and bends metal by heating it.

What is arc welding? As its name implies, the heart of the process is an electric arc. The arc plays between the work and a metal electrode that is clamped in a holder, which the operator holds in his hand. Cables run from the work and the electrode holder to the welding machine which supplies and controls welding current and heat of the arc.

Learning to weld is easy. Many welding equipment dealers and voctional agricultural departments of local high schools conduct short courses on arc welding during evening classes. These courses are very helpful, but not absolutely necessary. A good share of the farmers with welders learn to use them simply by practicing.

Little equipment is required for arc welding. You need a welding machine and cables to carry current from the machine to the work with an electrode holder on the end of one cable and a ground clamp on the other. A face shield with dark lenses prevents "sunburn" of the face while permitting the operator to watch the arc. Gauntlet-type gloves and rolled-down sleeves are recommended to prevent arm "sunburn". A supply of consumable electrodes for welding and an arc torch for heating, soldering, brazing round out the needs.

PROPERLY USED, an arc welder can save the farmer considerable time and money in making and repairing farm equipment and machinery. With the right equipment and a little practice, anyone can become an expert welder.

Types of Welders

There are two types of electric welders available for use on rural power lines. The AC output units are well established and capable of handling all routine farm welding. Recently, combination AC and DC welders have become available. They will do the same work as the AC machines, and also have DC which is preferred for lighter gauge work and for most metals other than mild steel. The AC/DC welders are transformer welders with rectifiers which change AC to DC.

Some portable engine-driven welders are also power generators that are used to operate power tools or lights on repair jobs. These welders are also used as stand-by emergency power generators which are em-

ployed during power failures.

Most farm welders are 180 ampere size. This means they have a maximum output of 180 amperes, sufficient to handle all routine farm welding. They meet the requirements of rural power lines. They are frequently called "limited input" machines to describe the fact that they draw less than 37.5 amperes input current.

Farm welders are rugged equipment. There is very little that can possibly go wrong with them. The only principal requirement for maintenance is to keep them in a well-ventilated location and periodically remove the case and blow the dust out of the inside of the machine.

Your Electrode Stock

You don't need a large stock of the consumable metal electrodes, but you should have several different types handy to do any job that might come along. A general purpose mild steel electrode (E-6011) will do most repair work. A second mild steel electrode (E-6013) should be available for welding sheet metal. Three different hard-surfacing electrodes will meet the requirements of most farms —one for metal-to-metal wear, another for metal used in sandy soil, and the third for metal used in rocky soil.

To completely round out your electrode stock, a few sticks of cast iron, stainless steel, and non-ferrous electrodes are recommended. Store electrodes in a good, dry spot; be sure to identify them so you don't accidentally use a cast iron electrode on mild steel. The cost of electrodes is practically negligible. For example, you can hardsurface the cutting edge and point of a plow with two electrodes worth about fifteen cents total.

Long an industrial tool, welding is as important to metalworking as a hammer and saw are to woodworking—and there's a lot of metal on the modern farm. □ □

Albert and His Cows

Milking Machines! Yes, this by far has been the greatest help to my husband's farming. Had it not been for this machine we would have long ago quit farming. Any farmer knows that milking 30-40 cows by hand is not an easy chore. Why my husband had to get up at least an hour earlier every morning, and he never got out of the barn until 9:30 or 10:00 o'clock at night. This made it fairly impossible to become active in social life. Albert's social life was in the barn with his herd of Holsteins.

But, more important than the lack of leisure time to spend with his family and in social life, was my husband's health. After he finished wrestling with those female cows morning and night, his arms ached so he couldn't sleep if he tried.

When we had the machines installed in 1933, we had happiness installed in our lives. Gone was Albert's dread of getting up at five in the morning. Gone were the long hours he spent every night in the barn. Now he could spend them in the house with the family. Gone was his painful experience of trying to sleep when his nerves would not relax.

There is no doubt about it—the milking machine is, was, and until the day of retirement will be the piece of electrical equipment that helps my husband most.

MRS. ALBERT FENSKE
LOGANVILLE, WISCONSIN

Powered by 5 hp. electric motor or PTO, Bowsher All-Purpose Burr Mill gives coarse to fine grind **without changing burrs.** Handwheel gives instant adjustment for any size grind. Uniform granular grind—no dust. Eliminates costly dust loss when grinding ear corn. Low hopper for easy scooping—only 30" high on rubber tires. Has 8-ft. elevator, spout turns in circle. Fully guaranteed. Send card today to the N. P. Bowsher Co., 918-E Webster St., South Bend, Ind.

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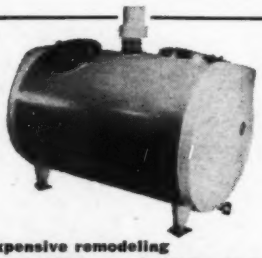

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STURDY CONSTRUCTION: 12 gauge stainless milk tank (ringed with steel)
SEALED COVERS: Protects milk quality
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Hatchery Air Conditioning

Heat pump provides year-round control—both heating and cooling

By **HENRY J. JOSEPHS**

An Alabama pioneer in the hatchery business, Curtis Allison of Bridgeport, hatches and sends out 75,000 baby chicks weekly. They go to broiler growers in Alabama and Tennessee.

He does not use conventional air conditioning or heating in his enterprise. Rather, he has installed heat pumps to handle the heating and cooling jobs. As a matter of fact, it is believed that he is the first hatcher in the nation to use electric heat pumps for year-round air conditioning and heating of a hatchery.

Heat Pumps Heat or Cool

Heat pumps operate on the "reverse cycle" principle. To cool, they work like the household refrigerator, removing heat out of the building and delivering it outside. In cold weather, the cooling cycle is simply and automatically reversed. The heat pumps capture heat in the outdoor air and use it to heat the building.

Allison chose the heat pump method for several reasons:

- He figures it will cut his heating cost in half or more as compared with electric resistance heat.
- For summer air conditioning, heat pumps use about as much power as a regular air conditioning system. But heat pumps eliminate the need for a cooling tower and pumps. Thus, he avoids a sizable bill for about 90,000 gallons of water.
- Heat pumps keep temperatures at desired levels every day of the year—automatically.
- Heat pumps supply a constant supply of fresh, filtered and conditioned air. While conventional air conditioning does a similar job, conventional heating normally does not draw in fresh air, nor does it filter the air.

Since Allison's plant has not been air conditioned before, he believes the installation of year-round air conditioning will actually make money for him. If he hatches 5% more chicks per tray during summer months, he increases his weekly chick count by about 4,000.

Cooling in summer and heating in winter helps every stage of a hatchery operation, not just the hatching. When eggs come into the hatchery, the first processing step is "traying" them by hand. Even temperatures and humidity control cuts down summertime losses by workers when handling eggs.

Proper Environmental Control Aids Entire Operation

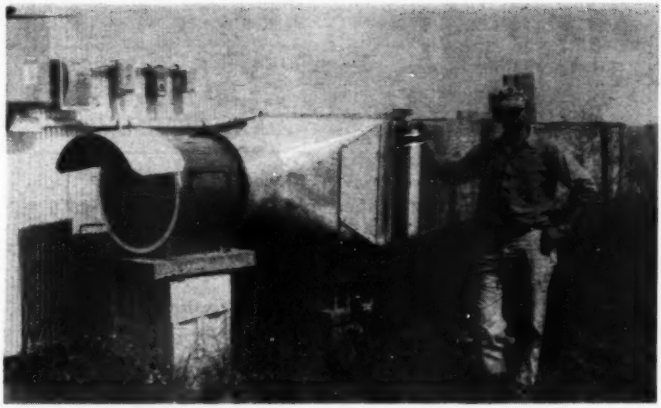
After traying, the eggs go to the setting incubator. This big machine maintains a 99° temperature and an 86% relative humidity. It also automatically turns the eggs. A controlled temperature and humidity in this room makes it easier for the incubator to do a good job.

Eggs are held in the incubator for 18 days. At the end of this period they are transferred to a hatching incubator where they hatch out in about three days. Here again, the controlled temperature and humidity created by the heat pump aids in the operation of this machine and minimizes smothering during summertime.

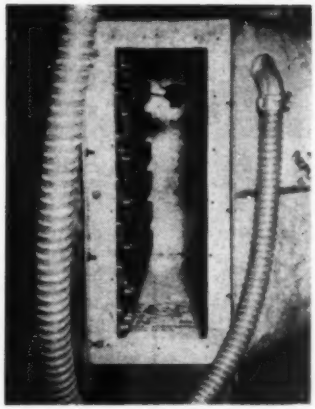
In the packing and shipping room, where delicate one-day old chicks are handled by the hundreds, controlled atmosphere greatly reduces losses by smothering during hot weather.

All of this adds up to more efficiency in the Allison hatchery operation—efficiency that means more profit. And more profit means more clear money with which to operate. □ □

HEAT PUMP, with 5 hp motor, switches automatically from heating to cooling and vice versa, a very desirable feature with mild days and cool nights.



DRYING SYSTEM consists of natural air fan, main duct with laterals to individual bins, and an electric heating unit mounted in main duct where Walker is resting his hand. This system was installed in June, 1957 and was used to dry Walker's '57 wheat crop.



Seven 2850-watt fin strip heaters raise duct temperature 19°F at an air flow of 1½ cubic feet/min., per bushel.

All Electric Grain Drying Progresses

Supplementary heat needed only at relative humidities above 60%

By JOHN R. DOLINGER

Exceptionally wet weather in Middle Tennessee during the early summer in 1957 made small grain harvesting a difficult job. However, there were a few farmers in Montgomery and Robertson counties who did not have to worry about combining grain with a high moisture. They were prepared to take care of it with electric heat!

About three years ago some Tennessee agricultural engineers began working on the idea of using electric heat to dry grain. One pilot system used seven 2850-watt fin strip heaters in conjunction with a 1½ hp fan to dry grain in five 1000-bushel steel bins. The first season it dried 2500 bushels of corn from approximately 20% moisture to 11%. The cooperating farmer reports excellent results with it.

To explain one of the systems more in detail let's take a look at the one installed by James Lee Walker of Clarksville, Tennessee. Walker had an existing granary in which he installed his drier. The building was 80 feet long by 20 feet wide, divided into 5 bins.

A 1½ hp fan was used to supply the air through a main duct 60 feet long, 2 feet wide, and 2 feet high. The main duct was constructed of weatherproof ¾ inch plywood and ran the length of the granary on the outside. Laterals, 16 inches x 2 feet, run from the main duct into each bin. These laterals were placed along the wall of the bin and then 6 inch x 8 inch laterals spaced two feet apart run across the bin to give an even air distribution through the grain.

Fan Runs Continuously

To operate the unit the fan is started manually and allowed to run as long as needed. The humidity controller was set at 60% and turned heat on automatically at this R. H. setting. When the relative humidity is lower than 60% unheated air is sufficient for drying. A high limit thermostat cuts the heaters off if the fan stops.

Walker has been highly pleased with his drier. He installed it in June of 1957 and immediately used it to dry 2300 bushels of wheat. At the time he was combining, the weather was wet and the relative humidity very high. The moisture content of his wheat ran as high as 20%. He dried the 2300 bushels of wheat in 14 days and used 2,509 KWHr. The remaining bins in the building can be used to dry other grains such as corn, oats, barley, and grain sorghum.

It will be interesting to watch the development of this application in the future. At least one manufacturer is already making a radiant tubular heating unit which can be installed directly into the fan housing or duct. This greatly simplifies the installation of the heating unit as no special duct work is needed. □ □

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Protects poultry fountains . . .

. . . cattle troughs!

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CRIMPS - CRACKS *Without Dusting*

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The Experts Say—

Most accidents involving buzz saws are due to negligence on the part of the operator. Before using the buzz saw, inspect the rig for loose or damaged parts. Poor footing, the lack of saw guards, and loose fitting clothes account for the majority of buzz saw accidents.—L. E. McCormick, Farm Forester, University of Missouri.

Proper poultry ventilation not only means more eggs, fewer respiratory outbreaks, less litter borne disease risks, less work and worry, but it gives you more freedom in the amount of floor space used per bird as long as there is sufficient feeder and water space per bird. With proper ventilation wet litter problems are fewer and a cleaner, more marketable egg is produced.—Ray Morrison, Poultry Husbandry, Kansas State College.

There is a method of laying underground water pipes between farm buildings so they never need to be dug up. This is done by laying a 4-inch line of cemented joint sewer pipe or composition asphalt pipe in the trench and then simply pushing the water pipe through so it can be removed for repairs at will. Another advantage of this method is that in case of a severe freeze, the pipe can be thawed out by blowing hot air through it.—W. C. Krueger, Extension Farm Engineer, Rutgers University.

The efficiency of a farm feed grinding and mixing operation not only depends upon type and size of equipment used but also the bin arrangement for storage of ground and unground feed. The cost of handling and grinding feed can become a few cents per ton for electric power as compared with a few cents per sack for methods now used on many farms.—E. S. Coates, Extension Agricultural Engineer, North Carolina State College.

In the March

ELECTRICITY ON THE FARM *Magazine*

LOOK FOR PRACTICAL ARTICLES ON

Water Heating For Dairy Enterprises

a round-up of equipment and practices used by dairymen in our leading dairy states

Irrigation

a sprinkler system adds 1 to 1½ inches to peaches on a 60-acre orchard

Dairy Barn Ventilation

with proper ventilation in spring, cattle remain an extra week in the barn while pastures get a better start

Electric Controlled Devices For Farmstead Equipment

timers, thermostats, switches, relays—details on their operation . . . making farm equipment as automatic as possible

Heat Pump For Conditioning Farm Homes

warm in winter, cool in summer —a pump with a dual role in making farm homes more comfortable and livable all year-round

Conveyors Handle Feed and Forage

an integrated system of conveyors and augers, all powered by fractional horsepower motors, doubles herd size without increasing labor or chore time

Major Appliance News

a report on new appliances introduced at the National Home Furnishing Show in Chicago last month

QUESTIONS AND ANSWERS

Tattle-Tale Gray Laundry Care

▶**Question:** *I recently purchased a new electric washer and dryer and noticed that some of my white clothes have a yellow tinge after being dried. What is causing this and what can I do about it?*

J.R.C., Ky.

▶**Answer:** Your problem is not unusual in hard water areas. In clear water, hardness minerals are invisible and do no harm. But when soap is added the trouble begins. The hardness minerals combine with the soap to form a curd. Even the thorough rinsing of an automatic washer is not enough to remove the film left on your clothes. When exposed to the dryer's heat, this film turns gray or yellow.

One method of correcting this situation is with a mechanical water softening unit. Another method is to add a packaged chemical softener to the rinse cycle of the automatic washer. The packaged softener will either precipitate hardness minerals out of the water or keep them in solution. A mechanical softener will remove the minerals completely and is definitely recommended for a complete solution to your washing problem, and for the protection of your plumbing system and mechanical equipment.

"YOU LEFT the lights on all night."

Motor Pulley Sizes

▶**Question:** *I once saw a very simple formula for figuring pulley sizes but now I can't find it. Do you know of any such formula?*

K.V.L., Ill.

▶**Answer:** You probably saw the formula "DR=dr" which gives a very close approximation for pulley sizes. It states that the diameter (D) of the motor pulley times the revolutions per minute (R) of the motor will equal the diameter of the driven pulley (d) times its revolutions per minute (r).

If you know any three factors of the equation, it is easy to solve for the fourth. If you know only two, you must assume a logical figure for one of the other two.

Lighting for TV Viewing

▶**Question:** *Can you settle a point on lighting for us? How much and what kind of lighting is recommended for viewing television?* S.D.C., Okla.

▶**Answer:** Lights should be down low but not off for watching television. Watching a bright television screen in an otherwise dark room tires the eyes. Use low light or soft, indirect light, placed at the back

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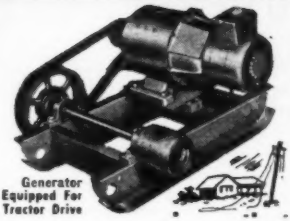

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Whenever you need further information about electrical equipment and appliances, you can depend upon the Manufacturers who are advertising in this magazine. We have indexed here for your convenience in alphabetical order the Manufacturers whose advertising is appearing in this February issue.

When writing to these Manufacturers be sure to mention you saw their advertising in ELECTRICITY ON THE FARM Magazine.

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If you are unable to get information about the particular equipment you require from our advertisers as listed above, our Reader Service Department will be glad to help you. As a reader of this magazine you are entitled to this information service free of cost.

of the television set, above it, or on either side to balance the bright light from the TV screen. Lights should not be located where they will reflect on the screen. The same holds true for daylight viewing. Judicious use of blinds, shades and draperies will give the proper level of daylight in the room.

Selecting Pump Sizes

▶**Question:** *How much water does a family need to take care of daily household needs?*

S.E.A., Iowa

▶**Answer:** For many years experts have recommended 50 gallons of water per day for each member of the household to take care of drinking, bathing, cooking, and laundering. This figure has now been increased to between 60 and 70 gallons to take care of the needs for automatic appliances such as dishwashers, automatic washers, garbage disposers and water softener back washing devices, all of which are constantly being added to our modern farm homes.

For livestock the following figures are generally used—producing cows, 35 to 40 gallons per day; dry cows or beef animals, 12 gallons per day; each hog or sheep, 3 gallons per day; chickens in coops with 14-hour a day lighting, 9 gallons per 100 birds.

Several other factors are also involved in the final selection of a pressure water system. We advise you to discuss your particular situation with your pump dealer or power supplier representative before you make the actual selection of the system itself.

New Publications

"Abbott's Electrical Code Handbook" revised by Charles L. Smith. McGraw-Hill Book Co., Inc., 330 W. 42nd St., N.Y. 36, N.Y., 650 pages, $8.00. This ninth edition is based on the 1956 Edition of the National Electrical Code. It explains in detail how to handle all types of wiring and installation jobs in strict accordance with the Code. The book follows the same numbering system as presented in the Code, making it easy to refer to any rule.

"Electricity and Electronics—Basic" by William B. Steinberg and Walter B. Ford. American Technical Society, 848 E. 58th St., Chicago 37, Illinois. 245 pages, $4.50. Written to provide basic instruction in the theory and application of modern electricity and electronics for schools and training programs, as well as on-the-job trainees, hobbyists and home craftsmen. The book provides a general discussion of basic principles and their application to the major types of electrical apparatus now in use, from "Making Use of Magnetism" to the development of television and the use of Geiger Counters.

Discussions of each basic principle and its application are followed by interesting, inexpensive projects for the reader to build. How to make a wet cell, light meter, transformer, a-c motor, carbon mike, selenium power supply, transistor radio—are just a few of the more than 50 carefully selected projects designed to create a permanent visual understanding of the basic principle. The book contains a great many helpful illustrations.

PRINTED PATTERNS

4644—Half-size fashion with straight, slimming lines; accent on clever cut of collar. Printed Pattern in Sizes 14½-24½. Size 16½ takes 4¼ yards 35-inch fabric.

4666—Wear this fashion as a jumper with blouse through the cool days of spring; as a sundress when summer comes. Printed Pattern in Half Sizes 12½-24½. Size 16½ takes 2⅞ yards 39-inch fabric.

9118—Soft, feminine lines—a style that looks well in any fabric. Printed Pattern in Misses' Sizes 12-20. Size 16 takes 4 yards 35-inch fabric.

4606—Perfect summer twosome—sundress with pretty yoke detail, bolero for cover-up. Printed Pattern in Half Sizes 14½-24½. Size 16½ dress takes 3¾ yards 35-inch fabric; bolero 1⅞ yards.

9090—Empire-princess dress with little fitted jacket. Sew-easy with our Printed Pattern. Misses' Sizes 10-20. Size 16 dress takes 4⅝ yards 39-inch fabric; jacket 1⅝ yards.

9102—Dress has smart neckline, slanted hip pockets; bolero provides a pretty between-season cover. Printed Pattern in Misses' Sizes 12-20; 40-48. Size 18 dress takes 3⅞ yards 35-inch fabric; bolero, 2¼ yards.

4767—Four-way wardrobe for daughter to make in sturdy cotton for summer play. Printed Pattern in Child's Sizes 2, 4, 6, 8, 10. Size 6 bra and skirt 1⅝ yards 35-inch fabric; shirt 1⅛ yards; shorts ⅞ yard.

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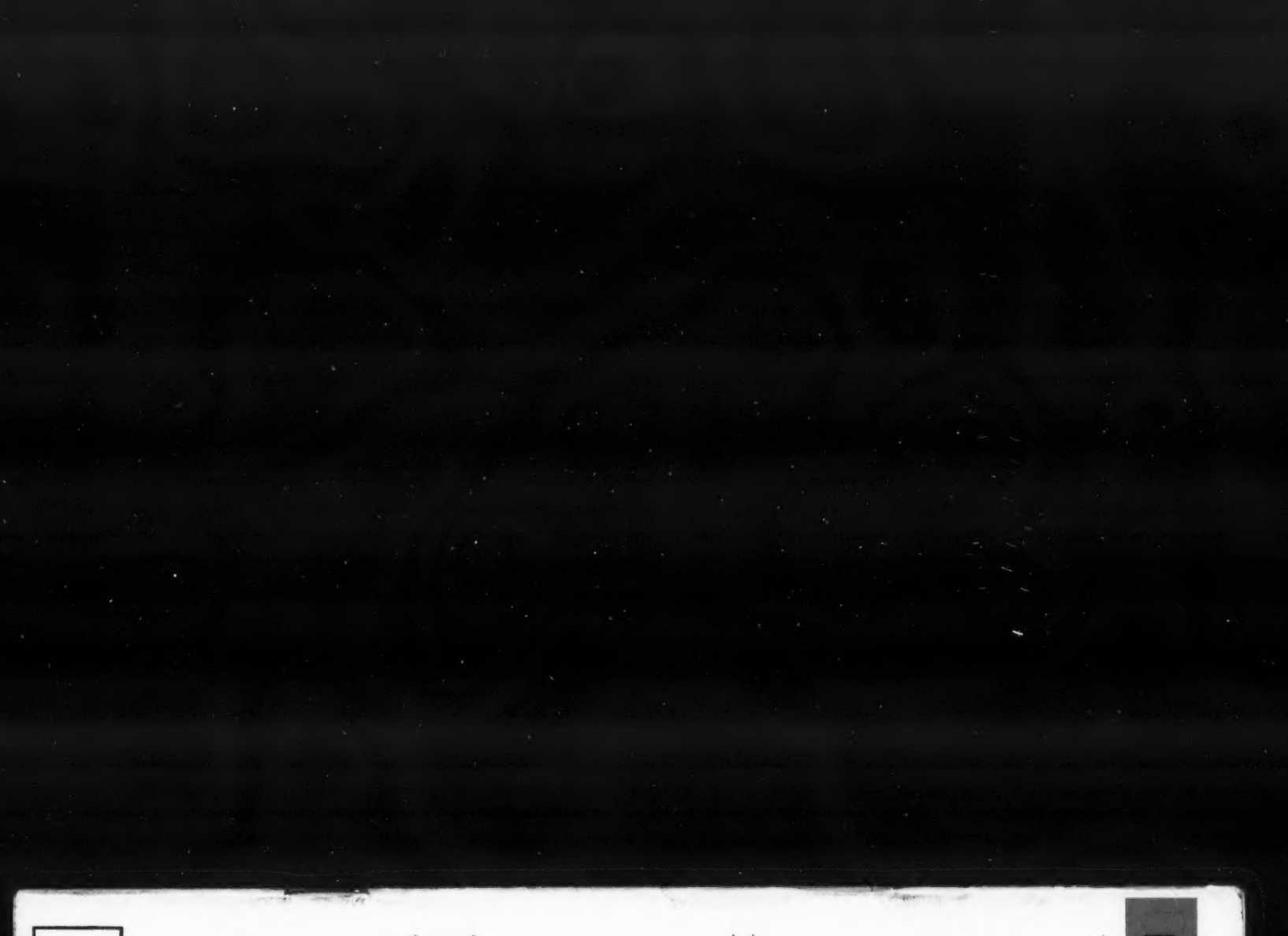
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